REMARKS

Claims 1-12 are pending in the application. A final Office Action was mailed on May 8, 2003. Applicants submitted a Response on October 7, 2003, together with a petition for two-month extension of time and proper extension fee. On November 5, 2003, an Advisory Action was mailed indicating that the Response of October 7 would not be entered.

With the present Preliminary Amendment, Applicants file a Request for Continuing Examination and Petition to Revive for Unintentional Abandonment. In the present Preliminary Amendment, Applicants amend claims 1 – 12 to further clarify the nature of their invention, and add new claims 13 and 14. No new matter is added.

REJECTION UNDER 35 U.S.C. § 112

Claims 1 – 12 are rejected under the first paragraph of 35 U.S.C. § 112 as containing subject matter that was not described in the specification in a way as to enable one skilled in the art to make or use the invention. Specifically, the Examiner suggests that there is confusion between the description in the specification describing use of Applicants' invention as a transition between IPv4 and IPv6 networks, and Applicants' claimed use as a routing control method between non-hierarchical and hierarchical networks.

Applicants amend claims 1 -12 to recite "a network of a first type and a network of a second type, respectively defined by first and second address spaces, the first and second address spaces each having network-identifying and host-identifying portions, wherein the network of the first type provides routing control by referencing a subset of address bits of the network-identifying portion of the first address space, and the network of the second type provides routing control by referencing an entirety of address bits of the network-identifying portion of the second

address space". Applicants respectfully submit that this recitation is supported, for example, by Applicants' FIG. 9, including the hierarchical routing table (for routing in the network of the first type) and the conventional routing table (for routing between networks of the first and second types).

In the Advisory Action mail on November 5, 2003, the Examiner asserts that Applicants' claimed network of the second type does not correspond to an IPv4 network, as routing in IPv4 can typically be performed using only a portion of the address space. The Examiner suggests, by way of example, that an IPv4 router routing to a network address may do so by using only a portion of the address space. Applicants respectfully disagree. Applicants respectfully submit that even in the case where the router routes to a IPv4 network address, the address may none-the-less require representation by the complete network identifying portion (see, e.g., page 1, line 44 through page 2, line 3 of Applicants' substitute specification, illustrating by way of example a network address necessarily identified by a complete IPv4 address "133.160.115.0/24" to be "133.160.115").

In the IPv4 network illustrated by Applicants' FIG. 3, routers A, B and C are not configured to interconnect IPv4 networks and hosts in manner that supports a pure hierarchy. For example, presenting the first order address "133" at router A is insufficient for clearly selecting one of routers B and C as the next hop. Instead, a complete IPv4 network address is required. By way of contrast, in the IPv6 network illustrated by Applicants' FIG. 4, routers are configured to support hierarchical routing. For example, identification of first order address β at the host A clearly dictates the router at the center of FIG. 4 as the next hop.

As a result, Applicants respectfully submit that IPv4 networks generally (or, alternatively, IPv4 networks as defined with referent to Applicant' FIG. 3) may not necessarily define a "next

hop" route without access to a complete IPv4 network address. In addition, Applicants submit that IPv6 networks (or, alternatively, IPv6 networks as defined with reference to Applicants' FIG. 4) can define a next hop route by referencing a subset of address bits of the network-identifying portion.

In added claims 13 and 14, Applicants further limit claims 1 and 12, respectively, such that the network of the first type is defined to be an IPv6 network, and the network of the second type is defined to be an IPv4 network.

Accordingly, Applicants respectfully submit that claims 1 –14 contain subject matter that was sufficiently described in the specification to enable one skilled in the art to practice the invention, and respectfully request that the rejection be withdrawn.

REJECTION UNDER 35 U.S.C. § 103

Claims 1 – 5 and 7 – 11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,157,950 to Krishnan in view of U.S. Patent No. 5,251,205 to Callon et al. (Callon I), "Routing Aspects of IPv6 Transition" to Callon et al. (Callon II) and "Transition Mechanisms for IPv6 Hosts and Routers" (Gilligan et al.). Claims 6 and 12 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Krishnan in view of Callon I, Callon II, Gilligan and U.S. Patent No. 6,046,999 to Miki et al. Applicants amend claims 1 - 12 to further clarify the nature of their invention, and respectfully traverse these rejections.

In independent claims 1 and 7, Applicants respectively disclose a routing control method and apparatus for a routing control method in a mixed environment of a network of a first type and a network of a second type. The network of the first type and network of the second type are respectively defined by first and second address spaces, each having network-identifying and host-identifying portions. The network of the first type provides routing control by referencing a

subset of address bits of the network-identifying portion of the first address space, and the network of the second type provides routing control by referencing an entirety of address bits of the network-identifying portion of the second address space. The claimed method includes the steps of:

a) assigning the network of the second type a virtual hierarchy number that corresponds to the subset of address bits of the network-identifying portion of the first address space and identifies a portion of the network of the first type at which the network of the second type is interfaced via a router,

b) attaching the virtual hierarchy number to a packet to be relayed at the router when the packet is to be relayed between the network of the second type and the network of the first type,

c) performing routing control by the virtual hierarchy number within the network of the first type, and

d) removing the virtual hierarchy number from the packet to be relayed at ~~a~~ the router when the packet is to be relayed between the network of the first type and a network of the second type.

The Examiner acknowledges that Krishnan does not disclose assigning and attaching a virtual hierarchy number to a packet to be relayed from a network of a second type to a network of a first type, where the virtual hierarchy number identifies a portion of the network of the first type at which the network of the second type is interfaced via a router, attaching the virtual hierarchy number to a packet to be relayed at ~~a~~ the router when the packet is to be relayed between the network of the second type and the network of the first type, performing routing control by the virtual hierarchy number within the network of the first type, and removing the

virtual hierarchy number from the packet to be relayed at the router when the packet is to be relayed between the network of the first type and a network of the second type. The Examiner suggests that Callon I, Callon II and Gilligan teach these limitations.

Callon II and Gilligan teach an IETF mapping format as illustrated in Applicants' Fig. 8. In this format, an IPv4-compatible IPv6 address is produced by placing the IPv4 address in the 32 low-order bits of an IPv6 packet, and inserting zeros in each of the 96 high-order bits of the packet. This can be contrasted with the approach disclosed by Applicants (illustrated, for example, in Applicants; FIG. 10), in which the IPv4 address is included in the 64 low-order bits reserved by the packet for the IPv6 interface ID, and a virtual hierarchy number, for example, is included in a 16-bit SLA ID field of the packet.

In this manner, as claimed in Applicants' amended independent claims 1 and 7, a distinct virtual hierarchy number may be assigned that corresponds to the subset of address bits of the network-identifying portion of the first address space and identifies a portion of the network of the first type at which the network of the second type is interfaced via a router (in other words, indicating that routing is to be performed by a router at the interface between the two networks). As a result, the IPv4 packet can be routed in the IPv6 network using IPv6 routing control by which a route is searched for without referring to the entirety of address bits in the packet. This is further illustrated in the example provided by Applicants' FIG. 9.

In sharp contrast, Applicants respectfully submit that the IETF format disclosed by Callon and Gilligan fails to meet the claimed limitations of Applicants amended claims 1 and 7. Rather, the IETF format simply inserts zeros in bit positions of the IPv6 packet not occupied by the IPv4 address, and thereby fails to provide a unique SLA ID that identifies a portion of the IPv6 network at which the IPv4 network is interfaced via a router.

Callon I discloses a multiple protocol routing method for routing TCP/IP and OSI 8473 packets in the same domain. According to the method of Callon I, a data packet of protocol A may be encapsulated to form a data packet of protocol B for transmission through a protocol B network (see, e.g., column 3, lines 13 – 141) of Callon I.

This approach is quite distinct from Applicants' claimed approach. In Applicants' claimed method, a data packet for a network of the second type is not encapsulated in a data packet for a network of the second type, but rather an address of the data packet of the second type is altered to conform to an address space of the network of the first type. In this manner, the packet for the network of the second type is assigned an address of the first type of network having a virtual hierarchy number which effectively identifies a portion of the network of the first type at which the network of the second type is interfaced via a router.

Applicants' invention enables efficient routing of the packet from the network of the second type within the network of the first type by employing an address scheme used by the network of the first type to reduce the number of address bits required for routing. In comparison to Callon I, Applicants' approach provides the advantage of avoiding the level of overhead that would be incurred by fully encapsulating a packet of the second type within a packet of the first type according to the approach of Callon I. Moreover, like Callon II and Gilligan, Callon I fails to suggest or disclose Applicants' claimed virtual hierarchy number that both corresponds to the subset of address bits of the network-identifying portion of the first address space, and identifies a portion of the network of the first type at which the network of the second type is interfaced via a router.

Accordingly, Applicants respectfully submit that amended independent claims 1 and 7 are not made obvious by any combination of Krishnan, Callon I, Callon II, Gilligan and Miki. As

claims 2 – 6 and 8 – 12 respectively depend from allowable claims 1 and 7, Applicants further submit that claims 2 – 6 and 8 – 12 are allowable for at least this reason.

CONCLUSION

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that claims 1 – 12, consisting of independent claims 1 and 7, and the claims dependent therefrom, are in condition for allowance. Passage of this case to allowance is earnestly solicited. However, if for any reason the Examiner should consider this application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged on Deposit Account 50-1290.

Respectfully submitted,

Thomas J. Bean
Reg. No. 44,528

CUSTOMER NUMBER 026304

Katten Muchin Zavis Rosenman
575 Madison Avenue
New York, NY 10022-2585
(212) 940-8729
Docket No.: FUJI 19.448 (100794-00187)
TJB:pm